What is Claimed Is:

1. A method of generating a statistical measure of performance from a measured process variable during ongoing operation of a process, comprising:

a) measuring the variable to generate a signal during the ongoing operation of the process;

b) taking a predetermined number (n) of samples from the signal during the ongoing operation of the process;

c) during the sampling, accumulating a running sum of the n samples, and accumulating a running sum of squares of the n samples, without storing all n samples; and

d) at the end of the sampling, processing a final value of the sum of the n samples and a final value of the sum of the squares of the n samples, to produce the statistical measure of performance.

2. A method as in claim 1, wherein the statistical measure of performance comprises variance of the measured process variable.

3. A method as in claim 2, wherein the processing step comprises:

computing a mean from the final value of the sum of the n samples;

computing a difference between the mean and the final value of the sum of the squares of the n samples; and

dividing said difference by n-1.

4. A method as in claim 1, wherein the statistical measure of performance comprises standard deviation of the measured process variable.

5. A method as in claim 4, wherein the processing step comprises:

computing a mean from the final value of the sum of the n samples;

computing a difference between the mean and the final value of the sum of the squares of the n samples;

dividing said difference by n-1; and

computing square root of a result of the dividing step.

6. A method as in claim 1, wherein the statistical measure of performance comprises variance of the measured process variable, and the method further comprises processing the variance to determine standard deviation of the measured process variable.

7. A method as in claim 6, further comprising dividing the final value of the sum of the n samples by n to produce a mean value, at the end of the sampling.

8. A statistical value computation apparatus, for generating a statistical measure of performance from a signal representing a process variable measured during ongoing operation of a process:

a sampler responsive to the signal representing the measured process variable, for sampling the signal during ongoing operation of the process to generate a predetermined number (n) of samples;

an interim computation module coupled to the sampler, for accumulating a sum of the n samples during ongoing operation of the process, and for accumulating a sum of squares of the n samples during ongoing operation of the process, without retaining all of the n samples; and

a one time computation module, coupled to the interim computation module, for computing the statistical measure of performance in response to the sum of the n samples and the sum of squares of the n samples.

9. An apparatus as in claim 8, wherein the interim computation module comprises:

a first accumulator loop receiving the n samples, for accumulating the sum of the n samples during ongoing operation of the process;

a multiplier for squaring each of the n samples as received from the sampler; and

a second accumulator loop coupled to an output of the multiplier for accumulating the sum of squares of the n samples during ongoing operation of the process.

10. An apparatus as in claim 9, wherein each of the accumulator loops comprises an adder, a register and a feedback from an output of the register to one input of the adder.

11. An apparatus as in claim 8, wherein the one time computation module comprises means for receiving the sum of the n samples and the sum of squares of the n samples and in response calculating:

$$\sigma^2 = \frac{1}{n-1}\left(\sum_{i=1}^{n} x_i^2 - n\mu^2\right)$$

where:

σ^2 is variance,

μ is mean of the n samples of the process variable; and

x_i is sample value taken in an ith sampling interval, in range from 1 to n.

12. An apparatus as in claim 11, wherein the one time computation module further comprises means for outputting the mean (μ) of the n samples of the process variable.

13. An apparatus as in claim 11, wherein the one time computation module further comprises means for taking a square root of the variance, to provide a standard deviation (σ) of the n samples of the process variable.

14. An apparatus as in claim 8, wherein the interim computation module and the one time computation module comprise microcode modules for execution by a programmed digital processor.

15. An apparatus as in claim 14, further comprising a machine-readable medium, wherein the microcode modules are stored on the machine-readable medium.

16. An apparatus as in claim 15, further comprising a processor for executing the microcode modules.

17. A device for computing a statistical value related to a measured process parameter during ongoing operation of the process, the device comprising:

a sampler responsive to a signal representing the measured process parameter for providing a predetermined number of samples of the measured process parameter in sequence, during operation of the process; and

means for generating and outputting a representation of at least one of variance of the measured process parameter and standard deviation of the measured process parameter in real-time, without retaining all of the predetermined number of the samples of the measured process parameter until completion of the sampling.

18. A device as in claim 17, wherein the means for generating are for generating the representation based on summation of the predetermined number of the samples of the measured process parameter and summation of squares of the predetermined number of the samples of the measured process parameter.